

Appendix G

Cost Engineering

Appendix G Cost Engineering

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APPENDIX G

COST ENGINEERING

Cost estimates were developed for the 13 foot dune, 50 foot berm plan and the 100 foot berm plan and extrapolated to cover the remainder of the array of alternatives discussed in the Coastal Engineering appendix D and the main report. Initially, protection for the entire 20-mile study area extending from the north town limits of Kitty Hawk to south town limits of Nags Head was considered as part of the scoping process. Preliminary estimates concentrated on dredging as the predominant category of project costs. As the National Economic Development (NED) Plan evolved, more detail was added to the cost estimate. The discussion below outlines the steps toward the estimates for the NED Plan.

Scoping Estimates

During the early evaluation of the alternative plans, emphasis was placed on accuracy in dredging costs. Costs were developed using the Corps of Engineers Dredge Estimating Program (CEDEP). The following assumptions were made: (1) year-round dredging; (2) initial construction of Kitty Hawk and Kill Devil Hills projects by pipeline dredge using borrow areas N1 and N2; (3) periodic nourishment of Kitty Hawk and Kill Devil Hills by hopper dredge from borrow area S1; (4) all work in Nags Head by pipeline dredge from borrow area S1. Refer to appendix C – Project Plans for the locations of the borrow areas.

Production records from dredging in Oregon Inlet and the construction of the storm damage reduction project Carolina Beach – Area South (Kure Beach) were used to determine effective time and aid in setting monthly production rates for pipeline dredging. Records from the Surfside and South Miami Beach nourishment contract furnished by Jacksonville District were used in calibration of the hopper dredging program and development of monthly production rates.

An allowance was added for other project costs, such as dune vegetation, public walkover structures, design, and construction management based on a percentage of the dredging costs. Table G-1 indicates the initial cost estimates that were developed for protection of the full length of the study area. Nags Head was divided in two segments because of its length; Nags Head is actually one town.

Costs of the NED Plan

A summary of the costs of the NED Plan is presented in Table G-2. The cost estimates in MCACES format are presented later in this appendix.

Based on the proposed project length, new costs were computed using various construction schedules and the monthly production rates described above.

**Table G-1. Scoping Estimates – Protection of Entire Study Area
October 1999 Price Level**

Location	Length (mi)	Initial Construction 13 ft dune, 50 ft berm	Initial Construction, 100 ft berm	Periodic Nourishment
Kitty Hawk	3.5	\$19,000,000	\$13,400,000	\$11,700,000
Kill Devil Hills	4.7	\$21,800,000	\$20,800,000	\$10,900,000
N. Nags Head	6.6	\$25,400,000	\$27,100,000	\$9,000,000
S. Nags Head	4.6	\$27,500,000	\$19,700,000	\$11,100,000
Total	19.4	\$93,700,000	\$81,000,000	\$42,700,000

The purpose of evaluating the alternative schedules was to determine the best way to balance costs, environmental resources, and to put the project in place quickly so that structures on the beach will not continue to be vulnerable to storm damages. The schedule selected begins with placement of sand for the north project in Kill Devil Hills and Kitty Hawk and the middle segment (third) of the south project 16 November of the first year of construction. The other portions of the south project will be constructed in the second and third years, with sand placement beginning 16 November. A contract will need to be in place earlier to allow the contractor sufficient time to mobilize and prepare to begin placing the sand. Nourishment for the south project is scheduled to be performed in three phases, similar to initial construction, with each phase beginning on Nov 16 of the year nourishment is scheduled to take place. The north project will be nourished from borrow area S1 by hopper dredge, beginning 1 Jan, and will be done in two phases. During most years of the project life, two dredging contracts will be necessary.

The plant selected as the basis for the cost estimates has typically been used for similar projects. Pipeline dredging is based on the 30-inch pipeline dredge. Hopper dredging was based on the medium class hopper dredge. If a large hopper dredge is available to bid on the periodic nourishment, there will probably be some savings; however, the plan formulation is based on the medium class because there is more plant available, which provides a more realistic approach to the plan formulation.

Today's dredging industry fleet does not possess the capability to construct and maintain all of the navigation and beach nourishment projects that will be proposed Corps of Engineers between now and FY 2007, when maintenance on this project is scheduled to begin. Plant has been added to the fleet in the past few years and is being added currently. It is anticipated that the industry fleet will continue to grow as opportunities for additional contracts arise. The value of the proposed maintenance contracts should make them attractive to the potential bidders; therefore it is expected there will be competition every year for the maintenance contracts. Since the trend for new plant is toward more efficiency and higher production, there is the potential for the

Table G-2. Cost of NED Plan - Rounded – October 1999 Price Level

Type of Expenditure	North Project	South Project		
		Middle Segment	Southern Segment	Northern Segment
Initial Construction	\$22,713,000	\$16,286,000	\$14,143,000	\$18,532,000
Periodic Nourishment	\$15,323,00	\$6,418,000	\$5,524,000	\$7,726,000
Annual Costs	\$200,000	\$200,000	\$200,000	\$200,000
Environmental Costs, not associated with initial construction or periodic nourishment, 5, 10, and 15 years after the first year of construction	\$36,000	\$28,000	\$28,000	\$28,000

costs of initial construction and periodic nourishment to decrease. For this study, costs have been developed conservatively based on vessels that are currently in use.

Code of Accounts

The summary cost estimates and MCACES estimates are presented in the code of accounts format. The costs included under each code are detailed below. The summary cost estimates have been rounded and will not exactly match the MCACES estimate which is not rounded.

01 – Lands and Damages: The estimated cost was furnished by the Real Estate Division, Savannah District, and are discussed in Real Estate appendix J. A 25 percent contingency has been applied to the real estate estimate as recommended by the real estate technical manager.

17 – Beach Replenishment: This account includes the costs for mobilization and demobilization, dredging, beach fill, and associated general items, which consists of dune vegetation, public dune walkovers, beach tilling, and extension of storm drainage structures.

Mobilization and demobilization are based on a 600-mile distance for a pipeline dredge and a 1,200-mile mobilization distance for a hopper dredge. These distances have been typical with other recent contracts. Most areas on the east coast are within 600 miles of the project area. Hopper dredges are often working on the gulf coast. Pipe is assumed to be delivered by truck. During the initial construction, there is a potential for some savings in the mobilization costs in the second and third years since it is possible that the low bidder on one or both of the contracts will be a contractor who is already at the site.

Dredging costs were discussed in the previous section of this appendix. Beach fill consists of the cost of shaping the dredged material to the required cross-section. Beach fill costs are based on a monthly cost for grading equipment over the anticipated duration of each contract.

The associated general costs consist of several categories of incidental costs. The cost of dune vegetation was based on information gathered for a contract modification and includes planting of sea oats, bitter panicum, and American beach grass along the foreslope, crest, and backslope of the new dune, application of soil amendments, and replanting of vegetation lost in

the first year. Other costs include public dune walkovers, beach tilling, and extension of storm drainage structures, which have been estimated based on experience with other recent contracts.

Contingencies for this part of the work have been set at 20 percent, as recommended by EI 01D010 dated 1 September 1997 for projects over \$10,000,000. The purpose of the contingency allowance is to cover potential variations in project requirements that cannot be defined at this time.

30 – Planning, Engineering, and Design The costs included in this account were furnished by those responsible for performing each activity. This account includes plans and specifications, field investigations and surveys, cost estimates, the federal portion of the real estate acquisition costs, engineering during construction, and project management. A 20 percent contingency was assigned to this account.

31 – Construction Management This account includes supervision and administration of the contracts by construction management and contracting personnel and project management. A 20 percent contingency has been applied.

Incidental Costs

No detailed breakdown of annual costs and environmental costs not associated with initial construction or periodic nourishment will be presented. An allowance for maintenance of dune vegetation, walkover structures, and emergency beach scraping after storms has been included as a project cost for the purposes of the benefit-cost analysis. Obviously, the scope of the annual maintenance activities will vary considerably from year to year depending on storms. The annual maintenance cost may be almost negligible in some years and very substantial in others. Most of the annual maintenance costs would be assigned to account code 17. The environmental costs cover an assessment of the long-term recovery of the benthic organism population in the borrow area. These costs would fall under account code 30.

TOTAL - ALL CONTRACTS ***** TOTAL PROJECT COST SUMMARY *****

THIS ESTIMATE IS BASED ON THE SCOPE CONTAINED IN THE FEASIBILITY REPORT, DATED SEP 2000

PROJECT: BASE COUNTY BEACHES, BEACH ISLAND PORTLAND - TOTAL PROJECT

LOCATION: DATE COUNTY, NORTH CAROLINA

RESPECT: P.O.C. WILMINGTON

CHARLES D. CANNON, JR. CHIEF, COST ENGINEERING

..... FULLY FUNDED ESTIMATE.....

TOTAL CONSTRUCTION COSTS ---->											
		477,858	95,572	25%	573,430	484,000	99,000	583,000	1,260,000	252,000	1,512,000
LANDS & DAMAGES		4,303	1,076	20%	5,379	5,000	1,000	6,000	5,000	1,000	6,000
PLANNING, ENGINEERING & DESIGN		28,772	5,364	20%	34,136	31,000	6,000	37,000	63,000	17,000	100,000
CONSTRUCTION MANAGEMENT		14,134	2,827	20%	16,961	15,000	3,000	18,000	38,000	9,000	47,000
TOTAL PROJECT COSTS ---->		525,067	105,425		631,496	545,000	109,000	654,000	1,387,000	280,000	1,667,000

TOTAL FEDERAL COSTS = 843,300
TOTAL MDX-FEDERAL COSTS = 819,200

THE MAXIMUM PROJECT COST IS \$1,700,000

DIVISION APPROVED: CHIEF, COST ENGINEERING

DIRECTOR, REAL ESTATE

CHIEF, PROGRAMS MANAGEMENT

DIRECTOR FIELD

APPROVAL DATE:

CHIEF, COST ENGINEERING
CHIEF, REAL ESTATE
CHIEF, PLANNING
CHIEF, ENGINEERING
CHIEF, TECHNICAL SERVICES DIVISION
CHIEF, PROGRAMS MANAGEMENT
PROJECT MANAGER
DIX FMD

THIS ESTIMATE IS BASED ON THE SCOPE CONTAINED IN THE FEASIBILITY REPORT, DATED SEP 2000

PROJECT: DARE COUNTY BEACHES (BODIE ISLAND PORTION) - INITIAL CONSTRUCTION

DISTRICT: WILMINGTON

LOCATION: DARE COUNTY, NORTH CAROLINA

P.O.C.:

CHARLES D. CARMEN, JR, CHIEF, COST ENGINEERING

ACCOUNT NUMBER	FEATURE DESCRIPTION	CURRENT MCACES ESTIMATE PREPARED:				Sep-00	AUTHORIZ. / BUDGET YEAR:		 FULLY FUNDED ESTIMATE.....			
		EFFECTIVE PRICING LEVEL:			Oct-99	EFFECT. PRICING LEVEL:		2000					
		COST	CNTG.	CNTG.	TOTAL		COST	CNTG.	TOTAL		COST	CNTG.	FULL
		(\$K)	(\$K)	(%)	(\$K)		(\$K)	(\$K)	(\$K)		(\$K)	(\$K)	(\$K)
17----	BEACH REPLENISHMENT	50,700	10,140	20%	60,840		52,000	11,000	63,000		55,900	14,000	69,900
	TOTAL CONSTRUCTION COSTS == == >	50,700	10,140		60,840		52,000	11,000	63,000		55,900	14,000	69,900
01----	LANDS & DAMAGES	4,303	1,076	25%	5,379		5,000	1,000	6,000		5,000	1,000	6,000
30----	PLANNING, ENGINEERING & DESIGN	2,892	578	20%	3,470		3,000	600	3,600		3,200	600	3,800
31----	CONSTRUCTION MANAGEMENT	1,654	331	20%	1,985		1,800	300	2,100		1,900	400	2,300
	TOTAL PROJECT COSTS == == >	59,549	12,125		71,674		61,800	12,900	74,700		66,000	16,000	82,000
THE MAXIMUM PROJECT COST IS == == == == >		\$ 96,300				TOTAL FEDERAL COSTS == == == == == >				53,300			
						TOTAL NON-FEDERAL COSTS == == == == == >				28,700			

TOTAL - ALL CONTRACTS

***** TOTAL PROJECT COST SUMMARIES *****

THIS ESTIMATE IS BASED ON THE SCOPE CONTAINED IN THE FEASIBILITY REPORT, DATED SEP 2000

PROJECT: DARE COUNTY BEACHES (BODIE ISLAND PORTION) - FUTURE MAINTENANCE

DISTRICT: WILMINGTON

LOCATION: DARE COUNTY, NORTH CAROLINA

P.O.C.:

CHARLES D. CARMEN, JR, CHIEF, COST ENGINEERING

		CURRENT MCACES ESTIMATE PREPARED: EFFECTIVE PRICING LEVEL:				Sep-00 Oct-99	AUTHORIZ. / BUDGET YEAR: EFFECT. PRICING LEVEL:			2000 1-Oct-00		 FULLY FUNDED ESTIMATE.....		
ACCOUNT NUMBER	FEATURE DESCRIPTION	COST (\$K)	CNTG. (\$K)	CNTG. (%)	TOTAL (\$K)	COST (\$K)	CNTG. (\$K)	TOTAL (\$K)	COST (\$K)	CNTG. (\$K)	FULL (\$K)				
17----	BEACH REPLENISHMENT	427,158	85,432	20%	512,590	4,420	88,000	530,000	1,150,100	290,000	1,440,100				
TOTAL CONSTRUCTION COSTS ===>		427,158	85,430		512,590	4,420	88,000	530,000	1,150,000	290,000	1,440,000				
01----	LANDS & DAMAGES	0	0		0	0	0	0	0	0	0				
30----	PLANNING, ENGINEERING & DESIGN	26,880	5,376	20%	32,256	28,000	5,000	33,000	77,200	19,000	96,200				
31----	CONSTRUCTION MANAGEMENT	12,480	2,496	20%	14,976	13,000	3,000	16,000	34,700	9,000	43,700				
TOTAL PROJECT COSTS ===>		466,518	93,302		559,822	45,420	96,000	579,000	1,262,000	318,900	1,580,000				
THE MAXIMUM PROJECT COST IS =====>					\$ 1,692,000	TOTAL FEDERAL COSTS =====>					790,000				
						TOTAL NON-FEDERAL COSTS =====>					790,000				

Summary of Initial Construction Costs - Rounded - Oct 1999 Price Level

North Project - Kitty Hawk/Kill Devil Hills

Account	Description	Quantity	Unit	Unit Price	Amount	Contingency	Total Cost
01	LANDS AND DAMAGES				1,262,000	316,000	1,578,000
17	BEACH REPLENISHMENT						
17.00	Beach Replenishment						
17.00.01	Mobilization, Demobilization, and Preparatory Work	1	JOB	LS	1,188,000	238,000	1,426,000
17.00.16	Pipeline Dredging	4,300,000	CY	\$3.00	12,900,000	2,580,000	15,480,000
17.00.70	Beach Fill	4,300,000	CY	\$0.40	1,720,000	344,000	2,064,000
17.00.99	Associated General Items						
17.00.99.01	Dune Vegetation	40	ACR	\$8,000	320,000	64,000	384,000
17.00.99.02	Public Dune Walkovers	15	EA	\$30,000	450,000	90,000	540,000
17.00.99.03	Beach Tilling	50	ACR	\$200	10,000	2,000	12,000
	TOTAL, BEACH REPLENISHMENT				16,588,000	3,318,000	19,906,000
30	PLANNING, ENGINEERING, AND DESIGN				820,000	164,000	984,000
31	CONSTRUCTION MANAGEMENT				204,000	41,000	245,000
	TOTAL COST - NORTH PROJECT				18,874,000	3,839,000	\$22,713,000

Summary of Initial Construction Costs - Rounded - Oct 1999 Price Level

South Project - Nags Head

Account	Description	Quantity	Unit	Unit Price	Amount	Contingency	Total Cost
01	LANDS AND DAMAGES				3,041,000	760,000	3,801,000
17	BEACH REPLENISHMENT						
17.00	Beach Replenishment						
17.00.01	Mobilization, Demobilization, and Preparatory Work						
	Middle Segment	1	JOB	LS	1,273,000	255,000	1,528,000
	Southern Segment	1	JOB	LS	1,191,000	238,000	1,429,000
	Northern Segment	1	JOB	LS	1,417,000	283,000	1,700,000
17.00.16	Pipeline Dredging						
	Middle Segment	2,680,000	CY	\$3.10	8,308,000	1,662,000	9,970,000
	Southern Segment	2,680,000	CY	\$2.60	6,968,000	1,394,000	8,362,000
	Northern Segment	2,680,000	CY	\$3.70	9,916,000	1,983,000	11,899,000
17.00.70	Beach Fill						
	Middle Segment	2,680,000	CY	\$0.40	1,072,000	214,000	1,286,000
	Southern Segment	2,680,000	CY	\$0.30	804,000	161,000	965,000
	Northern Segment	2,680,000	CY	\$0.40	1,072,000	214,000	1,286,000
17.00.99	Associated General Items						
17.00.99.01	Dune Vegetation	120	ACR	\$8,000	960,000	192,000	1,152,000
17.00.99.02	Public Dune Walkovers	31	EA	\$30,000	930,000	186,000	1,116,000
17.00.99.03	Beach Tilling	130	ACR	\$200	26,000	5,000	31,000
17.00.99.04	Extension of Storm Drains	1	JOB	LS	175,000	35,000	210,000
	TOTAL, BEACH REPLENISHMENT				34,112,000	6,822,000	40,934,000
30	PLANNING, ENGINEERING, AND DESIGN				2,072,000	414,000	2,486,000
31	CONSTRUCTION MANAGEMENT				1,450,000	290,000	1,740,000
	TOTAL COST - SOUTH PROJECT				40,675,000	8,286,000	\$48,961,000

Summary of Initial Construction Costs - Rounded - Oct 1999 Price Level

North Project and South Project

Account	Description	Quantity	Unit	Unit Price	Amount	Contingency	Total Cost
01	LANDS AND DAMAGES				4,303,000	1,076,000	5,379,000
17	BEACH REPLENISHMENT						
17.00	Beach Replenishment						
17.00.01	Mobilization, Demobilization, and Preparatory Work	1	JOB	LS	5,069,000	1,014,000	6,083,000
17.00.16	Pipeline Dredging	12,340,000	CY		38,092,000	7,619,000	45,711,000
17.00.70	Beach Fill	12,340,000	CY		4,668,000	933,000	5,601,000
17.00.99	Associated General Items						
17.00.99.01	Dune Vegetation	160	ACR	\$8,000	1,280,000	256,000	1,536,000
17.00.99.02	Public Dune Walkovers	46	EA	\$30,000	1,380,000	276,000	1,656,000
17.00.99.03	Beach Tilling	180	ACR	\$200	36,000	7,000	43,000
17.00.99.04	Extension of Storm Drains	1	JOB	LS	175,000	35,000	210,000
	TOTAL, BEACH REPLENISHMENT				50,700,000	10,140,000	60,840,000
30	PLANNING, ENGINEERING, AND DESIGN				2,892,000	578,000	3,470,000
31	CONSTRUCTION MANAGEMENT				1,654,000	331,000	1,985,000
	TOTAL COST				59,549,000	12,125,000	\$71,674,000

Summary of Periodic Nourishment Costs - Rounded - Oct 1999 Price Level

North Project - Kitty Hawk/Kill Devil Hills

Account	Description	Quantity	Unit	Unit Price	Amount	Contingency	Total Cost
17	BEACH REPLENISHMENT						
17.00	Beach Replenishment						
17.00.01	Mobilization, Demobilization, and Preparatory Work	1	JOB	LS	2,089,000	418,000	2,507,000
17.00.17	Hopper Dredging	1,055,000	CY	\$8.80	9,284,000	1,857,000	11,141,000
17.00.70	Beach Fill	1,055,000	CY	\$0.60	633,000	127,000	760,000
17.00.99	Associated General Items						
17.00.99.03	Beach Tilling	50	ACR	\$200	10,000	2,000	12,000
	TOTAL, BEACH REPLENISHMENT				12,016,000	2,404,000	14,420,000
30	PLANNING, ENGINEERING, AND DESIGN				497,000	99,000	596,000
31	CONSTRUCTION MANAGEMENT				256,000	51,000	307,000
	TOTAL COST - NORTH PROJECT				12,769,000	2,554,000	\$15,323,000

Summary of Periodic Nourishment Costs - Rounded - Oct 1999 Price Level

South Project - Nags Head

Account	Description	Quantity	Unit	Unit Price	Amount	Contingency	Total Cost
17	BEACH REPLENISHMENT						
17.00	Beach Replenishment						
17.00.01	Mobilization, Demobilization, and Preparatory Work						
	Middle Segment	1	JOB	LS	1,273,000	255,000	1,528,000
	Southern Segment	1	JOB	LS	1,191,000	238,000	1,429,000
	Northern Segment	1	JOB	LS	1,417,000	283,000	1,700,000
17.00.16	Pipeline Dredging						
	Middle Segment	945,000	CY	\$3.30	3,119,000	624,000	3,743,000
	Southern Segment	945,000	CY	\$2.70	2,552,000	510,000	3,062,000
	Northern Segment	945,000	CY	\$4.20	3,969,000	794,000	4,763,000
17.00.70	Beach Fill						
	Middle Segment	945,000	CY	\$0.40	378,000	76,000	454,000
	Southern Segment	945,000	CY	\$0.30	284,000	57,000	341,000
	Northern Segment	945,000	CY	\$0.50	473,000	95,000	568,000
17.00.99	Associated General Items						
17.00.99.03	Beach Tilling	130	ACR	\$200	26,000	5,000	31,000
	TOTAL, BEACH REPLENISHMENT				14,682,000	2,937,000	17,619,000
30	PLANNING, ENGINEERING, AND DESIGN				1,183,000	237,000	1,420,000
31	CONSTRUCTION MANAGEMENT				524,000	105,000	629,000
	TOTAL COST - SOUTH PROJECT				16,389,000	3,279,000	\$19,668,000

Summary of Periodic Nourishment Costs - Rounded - Oct 1999 Price Level

North Project and South Project

Account	Description	Quantity	Unit	Unit Price	Amount	Contingency	Total Cost
17	BEACH REPLENISHMENT						
17.00	Beach Replenishment						
17.00.01	Mobilization, Demobilization, and Preparatory Work	1	JOB	LS	5,970,000	1,194,000	7,164,000
17.00.16	Pipeline Dredging	2,835,000	CY		9,640,000	1,928,000	11,568,000
17.00.17	Hopper Dredging	1,055,000	CY		9,284,000	1,857,000	11,141,000
17.00.70	Beach Fill	3,890,000	CY		1,768,000	355,000	2,123,000
17.00.99	Associated General Items						
17.00.99.03	Beach Tilling	180	ACR	\$200	36,000	7,000	43,000
	TOTAL, BEACH REPLENISHMENT				26,698,000	5,341,000	32,039,000
30	PLANNING, ENGINEERING, AND DESIGN				1,680,000	336,000	2,016,000
31	CONSTRUCTION MANAGEMENT				780,000	156,000	936,000
	TOTAL COST				29,158,000	5,833,000	\$34,991,000

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20 Sep 2000
Eff. Date 10/1/2000

Tri-Service Automated Cost Engineering System (TRACES)
Dare County - North Portion - Initial Construction
Project Work Breakdown (WBS)

Time 8:33:27 AM

D:\Program Files\MCACES for Windows 32-Bit\Projects\DareNorth.MPJ

Dare County - North Portion - Initial
Construction

Designed By: Doug Quinn

Estimated By: Carroll Niesen

Prepared By: Cost Engineering Section - Wilmington District

Preparation Date: 5/26/2000
Effective Date of Pricing: 10/1/2000
Est Construction Time: 420

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Release 1.00.00

20 Sep 2000

Eff. Date 10/1/2000

Tri-Service Automated Cost Engineering System (TRACES)

Dare County - North Portion - Initial Construction

Project Work Breakdown (WBS)

Time 8:33:27 AM

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No Backup Reports Selected...	

20 Sep 2000
Eff. Date 10/1/2000

Tri-Service Automated Cost Engineering System (TRACES)
Dare County - North Portion - Initial Construction
Project Work Breakdown (WBS)

Time 8:33:27 AM

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Quantity	CONTRACT	CONTINGN	Total
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Level 1 Owner Costs Summary

01 Lands and Damages	1 LS	1,262,271	315,568	1,577,839
17 Beach Replenishment	1 LS	16,177,958	3,235,593	19,413,551
30 Planning, Engineering and Design	1 LS	819,400	163,880	983,280
31 Construction Management	1 LS	204,000	40,800	244,800
Total for Dare County - North Portion - Initial Construction		<u>18,463,629</u>	<u>3,755,841</u>	<u>22,219,470</u>

20 Sep 2000
Eff. Date 10/1/2000

Tri-Service Automated Cost Engineering System (TRACES)
Dare County - North Portion - Initial Construction
Project Work Breakdown (WBS)

Time 8:33:27 AM

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	Quantity	CONTRACT	CONTINGN	Total
Owner Costs Summary				
01 Lands and Damages				
Total for Lands and Damages	1	LS 1,262,271	315,568	1,577,839
17 Beach Replenishment				
00 Beach Replenishment				
01 Mob, Demob & Preparatory Work				
Total for Mob, Demob & Preparatory Work	1	LS 1,187,895	237,579	1,425,474
16 Pipeline Dredging				
Total for Pipeline Dredging	4,300	MCY 12,611,028	2,522,206	15,133,234
70 Beach Fill				
Total for Beach Fill	4,300	MCY 1,599,035	319,808	1,918,843
99 Associated General Items				
01 Dune Vegetation	40	ACR 320,000	64,000	384,000
02 Walkover Structures	15	EA 450,000	90,000	540,000
03 Beach Tilling	50	ACR 10,000	2,000	12,000
Total for Associated General Items	1	LS 780,000	156,000	936,000
Total for Beach Replenishment	1	LS 16,177,958	3,235,593	19,413,551
Total for Beach Replenishment	1	LS 16,177,958	3,235,593	19,413,551
30 Planning, Engineering and Design				
23 Constructn Contracts(s) Documnts				
01 Plans and Specifications (P&S)				
01 Field Investigation Report	1	LS 197,400	39,480	236,880
02 Plans and Specifications	1	LS 292,000	58,400	350,400
Total for Plans and Specifications (P&S)	1	LS 489,400	97,880	587,280
04 Environmental Studies Documents				
Total for Environmental Studies Documents	1	LS 184,000	36,800	220,800
07 Cost Estimates				
Total for Cost Estimates	1	LS 9,000	1,800	10,800
09 Contract Award Documents				
Total for Contract Award Documents	1	LS 5,000	1,000	6,000
10 Engineering & Design During				
Total for Engineering & Design During	1	LS 76,000	15,200	91,200
Total for Constructn Contracts(s) Documnts	1	LS 763,400	152,680	916,080
24 Value Engineerng Analysis Docmnt				
Total for Value Engineerng Analysis Docmnt	1	LS 14,000	2,800	16,800
26 Programs & Project Managmt Dcmnt				

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20 Sep 2000

Eff. Date 10/1/2000

Tri-Service Automated Cost Engineering System (TRACES)

Dare County - North Portion - Initial Construction

Project Work Breakdown (WBS)

Time 8:33:27 AM

Page 3

	Quantity	CONTRACT	CONTINGN	Total
Total for Programs & Project Managmt Dcmnt	1	LS 42,000	8,400	50,400
Total for Planning, Engineering and Design	1	LS 819,400	163,880	983,280
31 Construction Management				
23 Construction Contracts				
11 Supervision and Administration				
01 Prjt Office Supervn and Adminstrn	1	LS 183,000	36,600	219,600
Total for Supervision and Administration	1	LS 183,000	36,600	219,600
Total for Construction Contracts	1	LS 183,000	36,600	219,600
26 Programs/Project Managmnt Dcmnt				
Total for Programs/Project Managmnt Dcmnt	1	LS 21,000	4,200	25,200
Total for Construction Management	1	LS 204,000	40,800	244,800
Total for Dare County - North Portion - Initial Construction		18,463,629	3,755,841	22,219,470

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20 Sep 2000
Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)
Dare County - South Project - Initial Construction
Project Work Breakdown (WBS)

Time 9:12:22 AM

D:\Program Files\MCACES for Windows 32-Bit\Projects\DareSouth.MPJ

Dare County - South Project - Initial
Construction

Designed By: Doug Quinn

Estimated By: Carroll Niesen

Prepared By: Cost Estimating Section - Wilmington District

Preparation Date: 5/31/2000

Effective Date of Pricing: 10/1/1999

Est Construction Time: 920

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20 Sep 2000

Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)

Dare County - South Project - Initial Construction

Project Work Breakdown (WBS)

Time 9:12:22 AM

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Owner Costs Summary 2

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No Detail Report Selected...

Backup Reports

Backup Page

No Backup Reports Selected...

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20 Sep 2000
Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)
Dare County - South Project - Initial Construction
Project Work Breakdown (WBS)

Time 9:12:22 AM

Page 1

Quantity	CONTRACT	CONTINGN	Total
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Level 1 Owner Costs Summary

01 Lands and Damages	1 LS	3,040,929	760,232	3,801,161
17 Beach Replenishment	1 LS	34,104,816	6,820,962	40,925,778
30 Planning, Engineering and Design	1 LS	2,072,000	414,400	2,486,400
31 Construction Management	1 LS	1,450,722	290,145	1,740,867
Total for Dare County - South Project - Initial Construction		<u>40,668,467</u>	<u>8,285,739</u>	<u>48,954,206</u>

20 Sep 2000

Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)

Dare County - South Project - Initial Construction

Project Work Breakdown (WBS)

Time 9:12:22 AM

Page 2

Quantity

CONTRACT

CONTINGN

Total

Owner Costs Summary**01 Lands and Damages****Total for Lands and Damages****17 Beach Replenishment****00 Beach Replenishment****01 Mob, Demob & Preparatory Work**

01 Middle Segment

1 LS 1,272,999

254,600 1,527,599

02 Southern Segment

1 LS 1,191,000

238,200 1,429,200

03 Northern Segment

1 LS 1,417,000

283,400 1,700,400

Total for Mob, Demob & Preparatory Work

1 LS 3,880,999

776,200 4,657,199

16 Pipeline Dredging

01 Middle Segment

2,680 MCY 8,223,502

1,644,700 9,868,202

02 Southern Segment

2,680 MCY 6,836,712

1,367,342 8,204,054

03 Northern Segment

2,680 MCY 9,836,075

1,967,215 11,803,290

Total for Pipeline Dredging

8,040 MCY 24,896,289

4,979,257 29,875,546

70 Beach Fill

01 Middle Segment

2,680 MCY 1,242,461

248,491 1,490,952

02 Southern Segment

2,680 MCY 829,258

165,852 995,110

03 Northern Segment

2,680 MCY 1,164,809

232,962 1,397,771

Total for Beach Fill

8,040 MCY 3,236,528

647,305 3,883,833

99 Associated General Items

01 Dune Vegetation

120 ACR 960,000

192,000 1,152,000

02 Public Dune Walkovers

31 EA 930,000

186,000 1,116,000

03 Beach Tilling

130 ACR 26,000

5,200 31,200

04 Extension of Storm Drains

4 EA 175,000

35,000 210,000

Total for Associated General Items

1 LS 2,091,000

418,200 2,509,200

Total for Beach Replenishment

1 LS 34,104,816

6,820,962 40,925,778

Total for Beach Replenishment

1 LS 34,104,816

6,820,962 40,925,778

30 Planning, Engineering and Design**23 Constructn Contracts(s) Documnts****01 Plans and Specifications (P&S)**

01 Field Investigation Report

1 LS 498,000

99,600 597,600

02 Plans and Specifications

1 LS 758,000

151,600 909,600

Total for Plans and Specifications (P&S)

1 LS 1,256,000

251,200 1,507,200

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20 Sep 2000

Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)

Dare County - South Project - Initial Construction

Project Work Breakdown (WBS)

Time 9:12:22 AM

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	Quantity	CONTRACT	CONTINGN	Total
04 Environmental Studies Documents				
Total for Environmental Studies Documents	1 LS	452,000	90,400	542,400
07 Cost Estimates				
Total for Cost Estimates	1 LS	25,000	5,000	30,000
09 Contract Award Documents				
Total for Contract Award Documents	1 LS	15,000	3,000	18,000
10 Engineering & Design During				
Total for Engineering & Design During	1 LS	180,000	36,000	216,000
Total for Constructn Contracts(s) Docmnts	1 LS	1,928,000	385,600	2,313,600
24 Value Engineering Analysis Docmnt				
Total for Value Engineering Analysis Docmnt	1 LS	36,000	7,200	43,200
26 Programs & Project Managmt Dcmnt				
Total for Programs & Project Managmt Dcmnt	1 LS	108,000	21,600	129,600
Total for Planning, Engineering and Design	1 LS	2,072,000	414,400	2,486,400
31 Construction Management				
23 Construction Contracts				
11 Supervision and Administration				
01 Prjt Office Supervn and Adminstrn	1 LS	1,292,244	258,449	1,550,693
03 District Office S&A Documents	1 LS	104,478	20,896	125,374
Total for Supervision and Administration	1 LS	1,396,722	279,345	1,676,067
Total for Construction Contracts	1 LS	1,396,722	279,345	1,676,067
26 Programs/Project Managmnt Docmnt				
Total for Programs/Project Managmnt Docmnt	1 LS	54,000	10,800	64,800
Total for Construction Management	1 LS	1,450,722	290,145	1,740,867
Total for Dare County - South Project - Initial Construction		40,668,467	8,285,739	48,954,206

Appendix G-25

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20 Sep 2000

Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)

Dare County - North Portion - Periodic Nourishment

Project Work Breakdown (WBS)

Time 9:24:48 AM

D:\Program Files\MCACES for Windows 32-Bit\Projects\DareNorthPN.mpj

Dare County - North Portion -
Periodic Nourishment

Designed By: Doug Quinn

Estimated By: Carroll Niesen

Prepared By: Cost Engineering Section - Wilmington District

Preparation Date: 5/26/2000

Effective Date of Pricing: 10/1/1999

Est Construction Time: 360

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Tri-Service Automated Cost Engineering System (TRACES)

Dare County - North Portion - Periodic Nourishment

Project Work Breakdown (WBS)

Time 9:24:48 AM

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No Detail Report Selected...	
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No Backup Reports Selected...	

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20 Sep 2000

Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)

Dare County - North Portion - Periodic Nourishment

Project Work Breakdown (WBS)

Time 9:24:48 AM

Page 1

Quantity	CONTRACT	CONTINGN	Total
----------	----------	----------	-------

Level 1 Owner Costs Summary

17 Beach Replenishment	1	LS	11,965,545	2,393,109	14,358,654
30 Planning, Engineering and Design	1	LS	497,300	92,260	589,560
31 Construction Management	1	LS	256,000	47,000	303,000
Total for Dare County - North Portion - Periodic Nourishment			<u>12,718,845</u>	<u>2,532,369</u>	<u>15,251,214</u>

20 Sep 2000

Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)

Dare County - North Portion - Periodic Nourishment

Project Work Breakdown (WBS)

Time 9:24:48 AM

Page 2

Quantity	CONTRACT	CONTINGN	Total
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Owner Costs Summary**17 Beach Replenishment****00 Beach Replenishment****01 Mob, Demob & Preparatory Work****Total for Mob, Demob & Preparatory Work**

1	LS	2,088,792	417,758	2,506,550
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17 Hopper Dredging**Total for Hopper Dredging**

1,055	MCY	9,288,309	1,857,662	11,145,971
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70 Beach Fill**Total for Beach Fill**

1,055	MCY	578,444	115,689	694,133
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99 Associated General Items**03 Beach Tilling**

50	ACR	10,000	2,000	12,000
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Total for Associated General Items

1	LS	10,000	2,000	12,000
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Total for Beach Replenishment

1	LS	11,965,545	2,393,109	14,358,654
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Total for Beach Replenishment

1	LS	11,965,545	2,393,109	14,358,654
---	----	------------	-----------	------------

30 Planning, Engineering and Design**23 Constructn Contracts(s) Documnts****01 Plans and Specifications (P&S)****01 Field Investigation Report**

1	LS	153,000	30,600	183,600
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02 Plans and Specifications

1	LS	220,000	44,000	264,000
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Total for Plans and Specifications (P&S)

1	LS	373,000	74,600	447,600
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04 Environmental Studies Documents**Total for Environmental Studies Documents**

1	LS	30,300	6,060	36,360
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07 Cost Estimates**Total for Cost Estimates**

1	LS	12,000	2,400	14,400
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09 Contract Award Documents**Total for Contract Award Documents**

1	LS	10,000	2,000	12,000
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10 Engineering & Design During**Total for Engineering & Design During**

1	LS	65,000	5,800	70,800
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Total for Constructn Contracts(s) Documnts

1	LS	490,300	90,860	581,160
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26 Programs & Project Managmt Dcmnt**Total for Programs & Project Managmt Dcmnt**

1	LS	7,000	1,400	8,400
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Total for Planning, Engineering and Design

1	LS	497,300	92,260	589,560
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31 Construction Management**23 Construction Contracts****11 Supervision and Administration****01 Prjt Office Supervn and Adminstrn**

1	LS	214,000	42,800	256,800
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Tri-Service Automated Cost Engineering System (TRACES)

Dare County - North Portion - Periodic Nourishment

Project Work Breakdown (WBS)

Time 9:24:48 AM

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	Quantity	CONTRACT	CONTINGN	Total
03 District Office S&A Documents	1	LS 21,000	0	21,000
Total for Supervision and Administration	1	LS 235,000	42,800	277,800
Total for Construction Contracts	1	LS 235,000	42,800	277,800
26 Programs/Project Managmnt Docmnt				
Total for Programs/Project Managmnt Docmnt	1	LS 21,000	4,200	25,200
Total for Construction Management	1	LS 256,000	47,000	303,000
Total for Dare County - North Portion - Periodic Nourishment		12,718,845	2,532,369	15,251,214

Appendix G-31

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20 Sep 2000
Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)
Dare County - South Project - Periodic Nourishment
Project Work Breakdown (WBS)

Time 9:24:19 AM

D:\Program Files\MCACES for Windows 32-Bit\Projects\DareSouthPN.mpj

Dare County - South Project -
Periodic Nourishment

Designed By: Doug Quinn

Estimated By: Carroll Niesen

Prepared By: Cost Estimating Section - Wilmington District

Preparation Date: 5/31/2000
Effective Date of Pricing: 10/1/1999
Est Construction Time: 540

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Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)

Dare County - South Project - Periodic Nourishment

Project Work Breakdown (WBS)

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No Detail Report Selected...

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Backup Page

No Backup Reports Selected...

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Tri-Service Automated Cost Engineering System (TRACES)

Dare County - South Project - Periodic Nourishment

Project Work Breakdown (WBS)

Time 9:24:19 AM

Page 1

Quantity	CONTRACT	CONTINGN	Total
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Level 1 Owner Costs Summary

17 Beach Replenishment	1	LS	14,449,289	2,889,860	17,339,149
30 Planning, Engineering and Design	1	LS	1,182,700	236,540	1,419,240
31 Construction Management	1	LS	524,000	104,800	628,800
Total for Dare County - South Project - Periodic Nourishment			<u>16,155,989</u>	<u>3,231,200</u>	<u>19,387,189</u>

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20 Sep 2000

Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)

Dare County - South Project - Periodic Nourishment

Project Work Breakdown (WBS)

Time 9:24:19 AM

Page 2

Quantity	CONTRACT	CONTINGN	Total
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Owner Costs Summary**17 Beach Replenishment****00 Beach Replenishment****01 Mob, Demob & Preparatory Work**

01	Middle Segment	1	LS	1,272,999	254,600	1,527,599
02	Southern Segment	1	LS	1,191,000	238,200	1,429,200
03	Northern Segment	1	LS	1,302,011	260,402	1,562,413
Total for Mob, Demob & Preparatory Work		1	LS	3,766,010	753,202	4,519,212

16 Pipeline Dredging

01	Middle Segment	945	MCY	3,111,680	622,336	3,734,016
02	Southern Segment	945	MCY	2,502,470	500,494	3,002,964
03	Northern Segment	945	MCY	3,952,409	790,482	4,742,891
Total for Pipeline Dredging		2,835	MCY	9,566,559	1,913,312	11,479,871

70 Beach Fill

01	Middle Segment	945	MCY	363,572	72,715	436,287
02	Southern Segment	945	MCY	259,697	51,940	311,637
03	Northern Segment	945	MCY	467,451	93,491	560,942
Total for Beach Fill		2,835	MCY	1,090,720	218,146	1,308,866

99 Associated General Items

03	Beach Tilling	130	ACR	26,000	5,200	31,200
Total for Associated General Items		1	LS	26,000	5,200	31,200

Total for Beach Replenishment

		1	LS	14,449,289	2,889,860	17,339,149
Total for Beach Replenishment		1	LS	14,449,289	2,889,860	17,339,149

30 Planning, Engineering and Design**23 Constructn Contracts(s) Documnts****01 Plans and Specifications (P&S)**

01	Field Investigation Report	1	LS	387,000	77,400	464,400
02	Plans and Specifications	1	LS	572,000	114,400	686,400
Total for Plans and Specifications (P&S)		1	LS	959,000	191,800	1,150,800

04 Environmental Studies Documents

Total for Environmental Studies Documents		1	LS	75,700	15,140	90,840
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07 Cost Estimates

Total for Cost Estimates		1	LS	18,000	3,600	21,600
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09 Contract Award Documents

Total for Contract Award Documents		1	LS	15,000	3,000	18,000
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20 Sep 2000
 Eff. Date 10/1/1999

Tri-Service Automated Cost Engineering System (TRACES)
 Dare County - South Project - Periodic Nourishment
 Project Work Breakdown (WBS)

Time 9:24:19 AM

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	Quantity	CONTRACT	CONTINGN	Total
10 Engineering & Design During				
Total for Engineering & Design During	1	LS 97,000	19,400	116,400
Total for Constructn Contracts(s) Documnts	1	LS 1,164,700	232,940	1,397,640
26 Programs & Project Managmt Dcmnt				
Total for Programs & Project Managmt Dcmnt	1	LS 18,000	3,600	21,600
Total for Planning, Engineering and Design	1	LS 1,182,700	236,540	1,419,240
31 Construction Management				
23 Construction Contracts				
11 Supervision and Administration				
01 Prjt Office Supervn and Adminstrn	1	LS 428,000	85,600	513,600
03 District Office S&A Documents	1	LS 42,000	8,400	50,400
Total for Supervision and Administration	1	LS 470,000	94,000	564,000
Total for Construction Contracts	1	LS 470,000	94,000	564,000
26 Programs/Project Managmnt Docmnt				
Total for Programs/Project Managmnt Docmnt	1	LS 54,000	10,800	64,800
Total for Construction Management	1	LS 524,000	104,800	628,800
Total for Dare County - South Project - Periodic Nourishment		16,155,989	3,231,200	19,387,189

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